

We claim:

1. A system for receiving and handling incoming product streams of different characteristics to yield a final product stream, said systems comprising:

an incoming product line for each of said streams respectively, each of said lines including a combined preblender and pumping device operable to receive, preblend and pump the respective product stream into and through an output; and a continuous mixer operably coupled with the combined devices of each said product lines in order to receive said product streams of said outputs, into generate said final product stream,

each of said preblender and pumping devices including a hopper having an inlet and a spaced outlet, with a pair of elongated, axially rotatable flighted screws adjacent said outlet and oriented for moving product delivered through said outlet away from the device,

each of said screws including at least one screw section along the length thereof, said screw section having at least two separate flights thereon, with a full convolution of each flight having at least two relieved regions.

2. The system of claim 1, each of said screws having a plurality of said screw sections along the length thereof.

3. The system of claim 2, there being two equidistantly spaced relieved regions along each convolution of each respective flight.

4. A combined blending and pumping apparatus comprising:
a hopper having an inlet and a spaced outlet;
a pair of elongated, axially rotatable shafts located within said housing, each of said
shafts having a plurality of outwardly extending mixing elements coupled thereto,
5 and a ribbon blender assembly coupled thereto; and
a pumping assembly including an elongated housing presenting an input and an output,
said housing input operably coupled with said hopper outlet, and a pair of
elongated, axially rotatable, flighted auger screws within said housing an operable
to pump said product through and out of said housing.

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5. The apparatus of claim 4, said ribbon blending assemblies located adjacent
said hopper outlet.

6. A screw section comprising:
an elongated, axially bored central section; and
a pair of individual flights extending outwardly from said central section and along the
length thereof,
5 each of said flights having, along a full convolution length thereof, at least two relieved
zones.

7. The screw section of claim 6, there being two equidistantly spaced relieved
zones along each full convolution length of each of said flights.

10 8. The screw section of claim 6, each of said relieved zones extending from
the outer periphery of each flight to a point adjacent said central section.

9. A method of controlling a mixing system designed to receive incoming product streams of different characteristics respectively to yield a final product, said system including a plurality of incoming product lines and a mixer, said method comprising the steps of:

5 directing a respective incoming product stream into each of said incoming product lines, and analyzing each respective incoming product stream to determine an input characteristic thereof;

in response to said analysis of each respective incoming product stream, adjusting the input characteristics of each stream as necessary to create individual adjusted
10 incoming product streams each having a desired input characteristic;

directing the material making up said individual adjusted incoming product streams into said mixer and causing the mixer to mix said material to create said final product output from the mixer having a desired final product characteristic;

altering the adjustment of the respective incoming product streams as necessary to
15 achieve and maintain said desired final product output characteristic;

said altering step including this step of analyzing said material prior to passage thereof into the mixer and/or analyzing said final product output from the mixer and, in response to such altering step analysis, effecting said alteration of the adjustment of the respective incoming product streams.

20 10. The method of claim 9, including the step of analyzing said material prior to passage thereof into said mixer.

11. The method of claim 9, said incoming product streams comprising meat.

25 12. The method of claim 11, said input characteristics of each incoming product stream being the respective fat/lean ratio thereof.

13. A method of controlling a mixing system designed to receive incoming product streams of different characteristics respectively to yield a final product, said system including a plurality of incoming product lines and a mixer, said method comprising the steps of:

5 generating a plurality of incoming product streams in said incoming product lines, each of said incoming product streams having a desired input characteristic;
directing the material making up said incoming product streams into said mixer, and causing the mixer to mix said material to create said final product having a desired final product characteristic; and
10 analyzing said material prior to passage thereof into said mixer, and, in response to such analysis, adjusting the input characteristics of said plurality of incoming product streams as necessary to maintain said final product characteristic.

14. The method of claim 13, including the step of also analyzing said final
15 product to determine whether the final product has said desired final product characteristic.

15. The method of claim 13, said incoming product streams comprising meat.

16. The method of claim 15, said input characteristics of each incoming
20 product stream being the respective fat/lean ratio thereof.

17. The method of claim 13, said generating step comprising the steps of:
directing a respective incoming product stream into each of said incoming product lines,
and analyzing each respective incoming product stream to determine an input
25 characteristic thereof;
in response to said analysis of each respective incoming product stream, adjusting the input characteristics of each stream as necessary to create individual adjusted incoming product streams each having a desired input characteristic;

18. A mixing system, comprising:

a plurality of product lines each adapted for conveying an incoming product stream having an input characteristic;

5 a mixer operably coupled with said product lines and operable for mixing the material making up said incoming product streams to create a final product having a desired final product characteristic;

an analyzer located upstream of said mixer and operably coupled with said product lines to analyze said material prior to passage thereof into said mixer; and

10 apparatus operably coupled with said analyzer for altering the input characteristics of said streams as necessary to maintain this final product characteristic of the final product, in response to analysis information received from said analyzer.

19. The system of claim 18, said apparatus comprising a variable speed pump

operably coupled with each of said product lines.

15 20. The system of claim 18, said incoming product streams each comprising meat, said input characteristic being the fat/lean ratio of the corresponding incoming product stream, and said analyzer being a fat content analyzer.